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17. ABSTRACT (MAX. 250 WORDS)

A guide for the teaching of science in kindergarten and first grade is presented. The purpose is to help teachers in implementing the course requirements in science. The major goal is teaching children to think in a scientific way.

Suggested units for kindergarten are animals and plants, weather, discovery, and the five senses. The units for grade one are plants, animals, sound, and geology.

Concepts are built from experiences. Activities which promote and stimulate problem-solving situations and develop scientific attitudes are discussion, experiment, excursion, reading, the use of resource people, and evaluation.

Each unit described includes vocabulary, apparatus, equipment and supplies, problems and concepts, resources and activities. Teachers should develop science skills by the same intellectual processes involved in learning to read -- observation, visual and intellectual discrimination, and the inferring of logical relationships.

Suggestions are made for arranging the classroom in the light of scientific interests.

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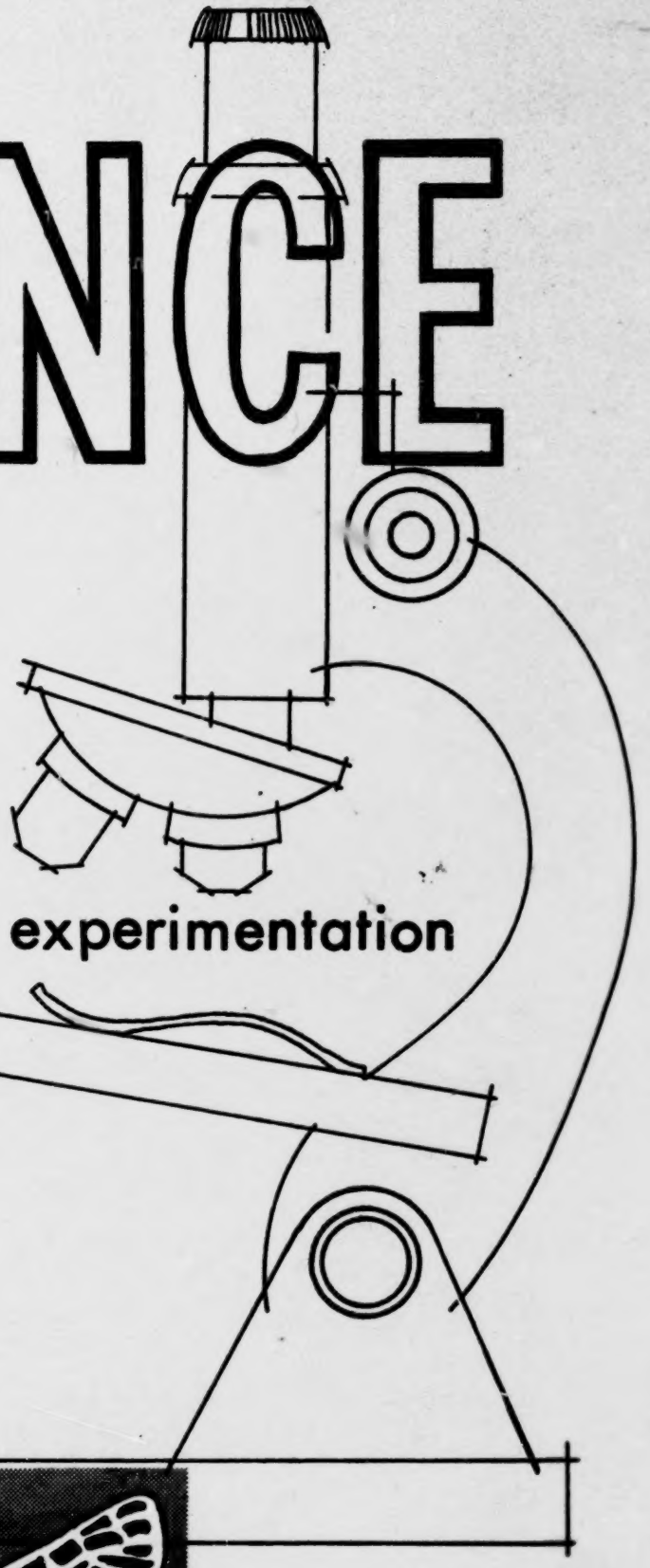
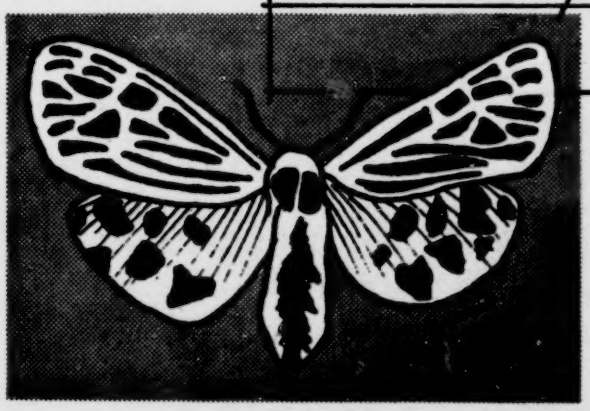
Kindergarten and Grade One

SCIENCE



experimentation

observation



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Fresno County Schools **Harold L. Coles, Sup't.**

FOREWORD

This Guide has been cooperatively prepared by personnel from school districts in Fresno County and by staff members in the Office of the County Superintendent of Schools. The primary purpose for its publication is to provide a source of help for teachers in implementing the Course of Study requirements for science.

The suggestions contained herein are not to be considered all-inclusive, or final. They are simply a record compiled by teachers who taught a unit but who may wish to alter it some way when they teach it again.

Teachers are urged to keep the unit up-to-date by consulting A-V catalogs and the library for the latest instructional aids. You are urged to call upon staff members from this office who will be most happy to assist you in improving the science program in any way possible and will in turn appreciate constructive ideas which you may offer.

A limited number of copies of this unit have been produced so that revision can be made economically incorporating any modifications which may arise from use in the classroom.

This publication has been produced with knowledge and approval of the Fresno County Board of Education.

Harold L. Coles

HAROLD L. COLES
Superintendent of Schools
Fresno County

HLC:nb

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Recognition and sincere appreciation is expressed to those teachers who devoted many hours of effort both in and outside of the classroom to the preparation of this Guide.

Preparation of the Guide was greatly aided by the cooperation of Governing Boards and Administrators who provided two days of released time for the teachers who worked on the project.

Teachers, districts and administrators are as follows:

Teacher	District	Administrator
May Brash	Herndon	Milford Reinartz
Edith Broderson	McKinley-Roosevelt	R.P. Dahlstrom
Ruby Del Rio	Westside	Norman L. Jaco
Frances Henson	Riverdale	Geo. F. Williams
Gladys Nance	Sierra	W.F. Barcus
Elizabeth Sullivan	Cantua	Roy Kinney

Members of the County Superintendent's Staff who also served are: Stewart Brown, Chairman of Science Curriculum Committee, Jane Churchman, Harold Walton, and Ben H. Watkins.

* * * * * * *

SCIENCE COURSE OF STUDY

ALLOCATION OF SCIENCE AREAS FOR EMPHASIS

AREA OF STUDY	GRADES 1	2	3	4	5	6	7	8
Animals	X		X		X		X	
Astronomy		X		X		X		X
Chemistry			X	X		X		X
Conservation					X			X
Geology	X		X		X		X	
Heat		X	X			X	X	
Light		X				X	X	
Machines & Engines		X		X	X			X
Magnetism & Electricity		X	X		X	X		X
Meteorology		X		X		X	X	
Plants	X		X		X			X
Sound	X		X			X	X	
Water				X				

The division of responsibility for science instruction is shown on this chart. Such a division decreases the number of topics to be treated at any given grade level with a more thorough study made possible. If it is faithfully followed, it will also prevent gaps in science experiences.

If a particular topic was not studied during the year preceding, then the teacher must develop the concepts which otherwise would have been developed in the lower grade. Only in the seventh grade does a teacher ever have to go into a topic as created at a higher grade level.

In addition to the topics assigned to each grade, the teacher should feel free to give adequate treatment to any problems presented by children themselves as a "current" or "on the spot" science interest.

Generally speaking, the concepts to be developed in any area at any grade level will be found in the state adopted science texts for that grade or those used in a lower grade as mentioned in the second paragraph above. The fourth grade unit on water was developed from different science texts all of which are available as a Science Text Set for fourth grade. The seventh grade will need to use eighth grade references on topics which are studied for the last time in the seventh grade.* As a teacher in any grade, you may request a Science Text Set from the library which will aid in the development of concepts. You are also urged to use the unit materials from the library and the instructional aids from the Audio-Visual Department.

*See chart above.

The "HOW" of Teaching Science in the Elementary School

...concepts are built from experiences and not memorized from printed materials.

...the teacher must not tell pupils the answers
...the teacher's role is to establish the problem
...the teacher must let pupils make some mistakes

...teachers must be alert at all times and consciously attempt to set up or call attention to situations providing problem-solving techniques.

...experiments that do not work the first time often are the most productive learning situations.

...the following types of activities will promote and stimulate problem-solving situations and help develop scientific attitudes.

...discussion

---will help to answer problems
---will help clarify the problem or concept
---will help pupils realize that explanations are not always reliable--additional sources of information are needed
---will give pupils opportunities to share experiences about the problem or concept
---will encourage in thinking

...experiment

---will help clarify problems
---will help in finding solutions to problems
---will alleviate superstitions
---will need several performances to prove that experiment is reliable
---will be accompanied by reading and discussion
---should not be mere demonstrations on the part of the teacher or one pupil
---equipment should be left in the room for pupil use for several days
---children should be able to apply conclusions to other situations

*the application of the experiment and the method used in performing it are just as valuable as knowledge gained.

...excursion

---many opportunities are in the out-of-doors
---children should know "why" they are going
---there should be careful group planning
---extends child's interests, knowledge and understandings
---child grows in ability to observe and see
---child grows in learning to report accurately observations
---observations should be checked against authorities

...reading

---occupies a large place in science
---may develop leads for investigation
---orients pupil to the concept
---gives pupil illustrations to check for accuracy and information
---gives reliable information to check with observations
---science material may be the only kind of material some children will read

The "HOW" of Teaching Science in the Elementary School (Cont'd)

...audio-visual materials

---is another way to help solve a problem
---should not constitute the whole program
---there should be preparation for use and follow-up
---the teacher may need to use the material several times

*types of audio-visual materials that can be used

---realia--what one can see with the eye
---pictures
---collected specimens
---phonograph recordings
---live objects--plant or animal
---objects--rocks, minerals
---slides
---filmstrips and films

...construction

---individual and group projects do not constitute a science program
---one way a child learns is by doing
---children grow by manipulating and constructing when it has a purpose and extends an interest

...creative expression

---the idea expressed and the science concepts should be important, not the product itself

...observing

---first hand experiences are the most valuable
---helps to determine how things look
---helps to determine how things act
---helps us to be aware of cause and effect
---helps us to realize change and interdependence in plants and animals
---helps us to interpret things that we read
---helps us to realize how man controls his environment (soil, water, etc.)

...collecting

---satisfies a natural curiosity of children
---be sure the collection is helping to solve a problem
---plan collections carefully so they have meaning
---collections do not constitute the science program

...resource people

---can give reliable information about the local area
---help to stimulate interest

*resource person should be able to talk on the level of the group

The "HOW" of Teaching Science in the Elementary School (Cont'd)

...<u>evaluation</u>

---activities designed for evaluating are extremely useful as learning activities
---achievement should always be interpreted in relation to the device used
---teachers should also place a value on the experiences she has offered the children

ARRANGING THE CLASSROOM FOR SCIENCE INTERESTS

I. <u>The Nature Table</u>:

A. What type of table should be used for the display?

1. Any regular classroom table.

2. Any space designated as "display space" in the room planning. (ledge, top of low cupboard, etc.)

3. A round table. (ideal because of accessibility)

B. Where should the display table be placed?

1. The display table should be in any central, easily-accessible place.

C. When should the display table be used?

1. Use the table upon arrival of the children before school formally opens.

2. Use the table during work time.

3. Use the table after clean-up time -- if time permits.

D. How long should science materials be displayed?

1. Some displays should be permanent.

a. Fish.

b. Turtles.

c. Insect homes.

2. Other displays should be changed to match the seasons and as often as the children's interests dictate.

II. <u>Ways of Displaying Science Materials</u>:

A. Arrange the display on colored paper.

B. Arrange on small trays of various sizes.

C. Arrange on paper plates. (various sized plates may be painted by the children.)

D. Use cardboard boxes with cellophane inserted as a window in the box lid.

E. Use test tubes, or alka-seltzer bottles, etc., in a test tube rack to display wild or garden flowers, weeds, etc.

F. Use corrugated paper rolled tightly as holders to display feathers, weeds, etc.

Arranging the Classroom for Science Interests (Cont'd)

G. Use rocks in a bowl of water to grow bulbs.

H. Use glass bowl for observing seed germination, planting seeds close to the glass.

I. Display science books and pictures on stands with objects on display.

J. Use an aquarium for displaying fish and marine life.

K. Use a terrarium for displaying plants and small animals.

L. Use small plastic bags to display seeds and leaves.

M. Cages for visiting pets may be placed near the science center. (call about restrictions from County Health Department)

N. An insect house may be placed in the science display center.

SCIENCE GUIDE

Unit Animals and Plants

Grade Kindergarten

Fresno County Schools
HAROLD L. COLES, Superintendent
September, 1964

INTRODUCTION TO UNITS

This guide was written to help the classroom teacher place greater emphasis upon science as an integral part of the school program. It assumes that science is not only an organized body of knowledge but also that science is a way of thinking -- a way of solving problems, which is usually designated by the phrase "the scientific attitude." Teaching children to think in a scientific way then is the major goal of this guide. This means that teachers do not have to know all the "answers." The teacher will act as a guide to help children formulate their problems -- to set the stage for children to discover, and find solutions.

.....Science experiences must provide the foundation of the scientific method when curiosity is fresh -- when the language sense is sufficiently advanced.

.....Develop science skills by the same intellectual processes involved in learning to read:

-- observation

-- visual and intellectual discrimination

-- inferring logical relationships

.....Aim at firsthand experiences and activities for the child and minimum telling-for-the-sake-of-information from the teacher.

.....Approach science concepts through the "How do we know?" method of inquiry.

Units in this guide may be used in any order. Some may be carried out throughout the year.

VOCABULARY

(Animals)

barns

brooder

cage

circus

coops

corral

domestic

earthworm

farm

feathers

fins

fur

hibernation

hutch

jungle

pets

poultry

ranch

shed

shells

shelter

stalls

tame

wild

zoo

APPARATUS, EQUIPMENT, AND SUPPLIES

Animal cage -- clay

PROBLEMS AND CONCEPTS

There are many kinds of animals.
Some animals are wild.
Some animals are domestic (tame).
Some animals are pets.

Animals live in different places and in different homes.

Animals have different body coverings - feathers, scales, fur, hair and shells.

Some animals are useful to man.

Animals move in different ways.

A circus or a zoo is a place where we can see wild animals.

Cows, pigs, fish, fowl, sheep and their products are edible.

All animals need food, water and air.

How do animals keep warm in winter?

Animals make different sounds.

RESOURCES

BOOKS

Beauchamp, Science is Fun, Book I

Schneider, Work and Play, Book I

Winston, The New I Wonder Why?

Singer Science Series
We Look and Listen
We Ask

Craig and Lembach, Science Everywhere

Los Angeles City Schools, 1956
Elementary Science Guide, Vol. I

Yashima, Mo Mo's Kittens

Study Prints

Monterey County Schools
Science Guide K-3

Scott, Thompson, Talking Time

Guide, Sound Ways to Good Speech

Catalogue - Audio-Visual Materials K-1-2-3

Records

Phoebe James, "Five Little Ponies"

ACTIVITIES

Keep an animal in the room. Take turns feeding it and cleaning the pen. (Setting hen, parakeets, rabbits, hamsters, rats, guinea pigs.)

Read the story "Mo Mo's Kittens." Discuss pets at home. Discover how we care for and feed them.

Build houses, i.e., birds. Use half-gallon milk cartons.

Make a booklet classifying animal pictures: wild, domestic pets.

Read stories about animals, birds.

Enjoy animal rhythms, i.e., Phoebe James "Five Little Ponies."

Paint animals.

Model pets from clay.

Learn poems and finger plays about animals.

Films and motion pictures - refer to catalogue, Audio-Visual Materials K-1-2-3.

Learn songs about animals.

Discover how animals keep warm in winter. Use a cloth or leather glove. Blow into each one as if you were blowing up a balloon. Could you blow up the cotton glove? Did the leather glove get big and fat?

POEMS

Animals

The cow in the pasture
Has nothing to do
But eat grass
And say, "Moo, moo-00!"

******

The big cow gives us milk each day,
At morning and at night,
At first it's warm and foaming up
And then it's cold and creamy white.

******

Finger Plays

The Little Pigs

1. Two mother pigs lived in a pen
   (Hold up both thumbs)

2. Each had four babies, and that made ten.
   (Hold up both hands)

3. These four piggies were black as night.
   (Hold up the fingers on the right hand)

4. These four piggies were black and white
   (Hold up the fingers on the left hand)

5. But all eight babies loved to play.
   (Hold up fingers of both hands - not thumbs)

6. And they rolled and rolled in the mud each day.
   (Roll hands as in Shoemaker Dance)

7. And at night they curled up in a heap.
   And with their mother went sound asleep.
   (Put hands together under cheek)

VOCABULARY

(Plants)

bulbs
flowers
fruit
leaves
roots
soil
stems
vegetables

APPARATUS, EQUIPMENT, AND SUPPLIES

bulbs
flower box
jars
seeds
soil

PROBLEMS AND CONCEPTS	RESOURCES
There are many kinds of plants	Riverside City Schools, Science Guide, Vol. I
Plants have roots, stems, leaves, flowers, seeds.	Beauchamp, Science Is Fun, Vol. I Basic Science Handbook, K-3
In the seed there is a baby plant.	Schneider, Work and Play Book, Vol. I
	Winston, The New I Wonder Why?
	Science and Conservation Series, Let's Find Out
The roots grow down in the soil. The stem grows up into the light Plants need air, food and light. Seeds of weeds and grasses are ripe in the fall. Most plants are green or partly green	Singer Science Series, We Look and Listen
	Scott, Thompson, Talking Time
	Guide, Sound Ways to Good Speech
	Audio-Visual Catalogue, Grades K-1-2-3

ACTIVITIES

If used in fall or spring, initiate by planting seeds and bulbs in either indoors or outdoor planters.

Collect pictures of different kinds of plants.

Take a walk around the school yard to note different kinds of plants. Point out stems, leaves, etc.

Examine and discuss several kinds of seeds. Experiment with these seeds in a jar. Vary soil, light and water. Observe growth.

Make chart stories about seeds carried by air, by animals, by birds, by people.

Plant beans in two jars. Cover one jar but not the other jar. Water both jars. See what happens to the beans in the jars.

Learn:

There was a little seed
It was very small indeed
But it made a little plant,
And it grew and it grew and it grew.

Collect:

Seed pods, acorns, cattails, pine cones, cotton, etc.

Films)
Filmstrips)
Refer to Audio-Visual Catalogue K-1-2-3

HLC:dm

SCIENCE GUIDE

Unit Weather

Grade Kindergarten

Fresno County Schools
HAROLD L. COLES, Superintendent
September, 1964

VOCABULARY

air

clouds

cold

direction

fog

frost

hot

rain

shade

shadow

snow

sunshine

temperature

thermometer

wet

wind

APPARATUS, EQUIPMENT, AND SUPPLIES

bowls

electric iron

hot plate

ice cubes

pan

stick - 3 or 4 feet long

teakettle

thermometer

toy sailboat

water

PROBLEMS AND CONCEPTS	RESOURCES
What kinds of weather do we have? Sunny, foggy, rainy, windy and cloudy.	Beauchamp and Holland, Basic Science Handbook K-3
Sun - gives warmth It is warmer in the sun than the shade. We see our shadows on a sunny day. Are shadows from the sun always the same? Does the sun make things hot?	Science and Conservation Series, Let's Find Out L.A. City Schools, Elementary Science Guide Schneider, Science for Work and Play Winston, The New I Wonder Why Craig-Bryan, Science and You Craig-Daniel, Science Around You Thurber, Exploring Science, Book 3 Fresno County Schools, Heat and Light, Science Workshop, 1958
Clouds - are between the earth and sun and move across the sky. They are made up of small drops of water called moisture. Fog is a cloud near the ground.	Science and Conservation Series, Let's Find Out Thompson and Scott, Talking Times
Rain - is water When it rains there are dark clouds in the sky. Rainy weather makes a difference in the way people dress. When air is cooled it loses some of its moisture.	Filmstrip "A Walk in the Rain" Recording "A Walk in the Rain

ACTIVITIES

Discuss and observe the different kinds of weather.

Put symbols on calendar for sun, fog, rain and wind.

Teach poems - "Talking Times."

Stand in sun and stand in shade to discover the temperature difference.

Discuss clothes worn on warm or sunny day. Compare clothes worn in summer and winter.

Watch our shadows. Mark shadow of a stick, flagpole or tree at different times of the day. (If you use a stick 3 or 4 feet long, put it in the ground and put a peg at the end of the shadow. Do this the first thing in the morning. Just before pupils go home put another peg in the ground at the end of a shadow again.)

Did the shadow get longer or shorter? Shadows change in length through the day.

Prove that the sun makes things hot.

Put same amount of water in each of two bowls. Feel temperature (hand or thermometer).

Put one bowl in sun.

Put one bowl in shade.

Take temperature again in 20 or 30 minutes (sun's rays caused temperature to rise).

Observe clouds and shadows.

Discuss where sun is when it is cloudy.

Discuss how air and clothes feel when it is foggy.

Discuss effect of fog on vision of a foggy morning.

Discover what fog is by heating water in teakettle and observing steam.

Discuss need for rain.

Discuss clothes worn on rainy day.

PROBLEMS AND CONCEPTS	RESOURCES

Wind - is moving air.

Air can be felt when it moves.

Air can move fast or slow.

Moving air can be helpful.

Moving air helps dry things more rapidly.

Wind moves things.

Temperature - is a factor in weather - it is a hotness or coldness.

The temperature of the air varies during the day and from day to day.

ACTIVITIES

Discover how rain is made.

Heat water in teakettle to boiling - hold pan of ice cubes near steam - observe moisture on the pan.

Teach poems in Talking Times.

Discover that wind is moving air.

Put toy sailboat in pan of water. Fan the air.

Fill a toy balloon with air; allow air to escape toward boat. Observe movement.

Discover that moving air evaporates water.

Put two spots of water on chalkboard. Fan one spot. Observe.

Draw or find pictures of things that the wind helps - sailboat, windmill, drying clothes, etc.

Make kites and fly them.

Learn the poems:

Who has seen the wind?
Neither I nor you.
But when the leaves hang trembling,
The wind is passing through.

Little wind, blow on the hilltop,
Little wind, blow on the plain,
Little wind, blow the sunshine,
Little wind, blow off the rain.

Discover that weather is hot and cold.

What does a thermometer do? Two thermometers - a glass of hot water (from faucet) and a glass of cold water. Put a thermometer in each glass. Read it and discover what happened. Where is the red line on the thermometer in the glass of hot water, high or low?

PROBLEMS AND CONCEPTS	RESOURCES
What does a thermometer do?	
Is air hotter closer to a heated electric iron?	Filmstrip: "Getting Ready for Winter"
The temperature is higher closer to something hot.	"When Autumn Comes"

ACTIVITIES

Where is the red line in the glass of cold water? By looking at the thermometers, how can you tell which glass has the hot water in it and which has the cold in it?

Discover the uses of a thermometer.

Thermometers tell us how warm things are.

Application:

1. When we are sick we use a thermometer to see how much temperature we have or how warm we are inside.
2. Mother uses a thermometer in the kitchen (candy and oven).
3. Weather report.
4. Cars have thermometers in them to show the temperature of their engines. Ask pupils to find these in their parent's cars.

Materials needed - electric iron, thermometer or three thermometers.

Put the thermometer two feet from the iron and record the temperature. Put six inches from the iron and record that temperature. Put one foot from the iron and record that temperature. Let the thermometer come back to room temperature after each recording. Which of the three thermometer readings is the highest? Where is the air hotter?

The closer we are to something hot the more apt we are to be burned. Temperature is higher closer to something hot.

SCIENCE GUIDE

Unit Discovering

Grade Kindergarten

Fresno County Schools

HAROLD L. COLES, Superintendent

September, 1964

VOCABULARY

BUTTER	COLOR	AIR	MAGNETS	MIRRORS	WATER
beater	mix	bubble	attract (pull)	image	float
buttermilk	pour	rainbow	magnet	reflect	raft
churn	shades			reflection	
cream					
dasher					
milk					

APPARATUS, EQUIPMENT AND SUPPLIES

BUTTER

bowl
churn
crackers
cream
egg beater
milk
paddle
salt

COLOR

bottles
food coloring
water

AIR

a liquid detergent
straws
water

MAGNETS

miniature toys and objects such as:

buttons (metal)
buttons (plastic)
foil
glass
4 magnets
needle
nail
pan (aluminum)
paper
paper (wax)
paper clips
penny
pin
plastic
rubber
string
thread
wire
wood

MIRROR

ball
box (shoe box or larger)
doll (little one)
3 mirrors
toy (little one)

WATER

ball (small)
balloon
boat (plastic)
bottle cover
buttons
container (large)
cork
cup (aluminum)
doll (plastic)
feather
nail
paper
pencil
rocks
seed pod
water

PROBLEMS AND CONCEPTS	RESOURCES
BUTTER	
How is butter made?	
What is it made from?	
How do we get the cream?	
COLOR	
What happens when we mix colors?	
AIR	
Where is air?	
Air moves, lifts and breaks.	Schneider, Science for Work and Play
What makes a bubble?	
What makes the bubbles break?	Craig, Daniel, Science Around You

ACTIVITIES

Make butter from cream in the classroom. Work salt into it and serve on crackers.

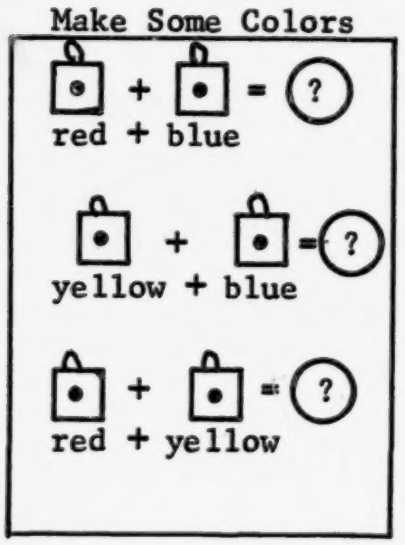
Cream should be at room temperature.

Discover how we get the cream.

Use bottles with water and add food coloring. Discover new colors.

Make chart.

Chart



Discuss various things about air.

Where is the air? (in water, in soil, all about us)

What can it do? (lift, move and break)

Place pamphlet over balloon and blow it up to show that air lifts things.

Place paper in front of the balloon and let air escape to discover that air moves things.

Make pinwheels or fans to discover that air makes things move.

Permit pupil to blow up balloon until it pops to discover that air can break a balloon.

Have a soap bubble party. Pupils use straws (for pipes) and small containers for soap (solution of liquid detergent) and blow and blow.

Discover that the air makes, lifts, and breaks the bubbles.

PROBLEMS AND CONCEPTS	RESOURCES
MAGNETS	
How do magnets attract (pick up) and move some things?	
Magnets are of various shapes and colors.	
Magnetism can attract through many different materials.	Thurber, Exploring Science, Book I
MIRRORS	
What can we do with mirrors?	Thurber, Exploring Science, Book II

ACTIVITIES

Discover that magnets attract and pick up things.

Use 2 paper plates - one labeled Yes and one No. Have children place articles collected (see Apparatus and Materials) in plates according to whether the magnet can pick them up - Yes, and not pick them up - No.

Discover magnets in our room, or any pupils might have at home (cupboard doors, etc.)

Discover that mirrors make a reflection.

Hold a mirror in the sunlight. See it make a spot on the wall. Move the mirror. What happens to the spot?

Put a ball in front of a mirror. How many balls do you see?

Put a mirror in front and one in back of you. Can you see the back of your head?

Put two mirrors together in the corner of a box. Put a little toy between the mirrors. How many toys do you see?

Discuss how people use mirrors:

Dentist looks in your mouth to see the back of your teeth.

The driver of the car looks behind him to see the car coming from behind.

See the back of one's clothes in the store.

Red reflectors are used on bumpers, bicycle, posts, etc.

PROBLEMS AND CONCEPTS	RESOURCES
<u>WATER</u>	
How many ways can water be used?	Fresno County Schools, <u>Science Kits</u>
What objects will float?	Winston, <u>The New I Wonder Why</u>
	Thurber, <u>Exploring Science</u>, Book I
	Craig, <u>Science Around You</u>

HLC:nb

ACTIVITIES

Discover how water helps us.

Tour school kitchen with consent of head cook. See how water is used in preparing and cleaning food, cooking it and then washing the dirty dishes.

Discuss how the weather bureau makes us aware of water (weather) conditions.

Four jars prepared using the same amount of water in each jar. Place a strip of tape on the jar to mark the water line. Cover one jar. Leave one jar uncovered. Use the other two jars for identical bouquets (white flowers work better) with colored water. Check amount of water each day. How and where does the water go from a vase of flowers? What happened to the other jars? Did it leak out? Did the sun take it up? Did the flowers drink it?

Discover that some things float on water.

Children experiment and place objects in two containers marked Yes and No. See list of objects listed under Water on page under Apparatus, Equipment and Supplies. Pupils can bring some objects and have class guess whether they think it will float or sink.

Rafts made of wood float. Some are made of cork and plastic. Inflated things float.

SCIENCE GUIDE

Unit The Five Senses

Grade Kindergarten

Fresno County Schools

HAROLD L. COLES, Superintendent

September, 1964

I. SMELLING AND TASTING

Vocabulary

color
difference
dry
extract
flakes
liquid
odor
powder
smell
sour
spicy
sweet
taste
wet

I. SMELLING AND TASTING

Apparatus, Equipment and Supplies

apples

bananas

bottles, small

bubble bath

chili powder

chocolate

cinnamon

cleanser

clorox

coconut

flour

flowers

garlic

hand lotion

jello

lemon juice

oil

onions

perfume

popcorn

rubbing alcohol

salt

soap, liquid

soap, powdered

starch, liquid

sugar

tooth paste

vanilla

vinegar

I. SMELLING AND TASTING

Problems and Concepts

Our senses of smelling and tasting help us -

To discover different smells
To find out what smells
To discover that things taste different

We learn by using our noses and tongues.

We taste with our tongues.

We can recognize many things by the way they smell.

Resources

Schneider, Science for Work and Play, Book I

Winston, The New I Wonder Why

Singer Science Series, We Look and Listen, We Ask

Riverside City Schools, Science Guide, Vol. I

Craig & Bryan, Science and You

Film:
Walt Disney, "You and Your Sense of Smell and Taste"

Filmstrip:
"You and Your Five Senses" (#2022)

Scott and Thompson, Talking Time

County Schools, The Sound Way to Good Speech

Craig & Lembach, Science Everywhere

I. SMELLING AND TASTING

Activities

Initiate this unit by showing the filmstrip of "You and Your Five Senses" to discover what our senses are.

Look at contents of bottle before smelling and guess what is in it. Have each child smell contents of bottle.

Taste, to identify, if necessary.

Tell how you use the ingredient.

Distinguish between sweet and sour.

Distinguish between things to eat and not to eat.

Popcorn involves all five senses.

Show film "You and Your Sense of Smell and Taste."

Learn the poems:

Popcorn Man

Popcorn Sound

II. FEELING

Vocabulary

cold
dry
fluffy
fuzzy
gritty
hard
hot
rough
smooth
soft
sticky
wet

Apparatus, Equipment, Supplies

apple
balloon
blindfold
cotton
feather
feel box
ice
jam or jelly
leather
metal
orange
plastic
rocks
sand
syrup
toys (small)
water
wood
yarn

II. FEELING

Problems and Concepts

By touching things we feel textures, degree of hardness, degree of temperature, degree of moisture.

We enjoy things by feeling.

Touching is a way to find cut.

Resources

Riverside City Schools, Science Guide, Vol. I

Singer Science Series, We Look and Listen

Winston, The New I Wonder Why

Schneider, Science for Work and Play, Book I

Craig and Bryan, Science and You

Film - Walt Disney
"You and Your Sense of Touch"

Record
"Put Your Finger in the Air"

II. FEELING

Activities

Provide a "Feel Box."

Permit children to identify a variety of small articles that have been placed in a box.

Blindfold child and let him feel to discover things: soft and hard; wet and dry; smooth, rough and sticky.

Play Game - Peter Piper

> I am Peter Piper the pickled pepper man.
> I wonder if _____(child)_____
> can guess what I put in his hand.
>
> (Pupil stands in front of teacher, who holds object over his head so the rest of the class can see it. He guesses what it is by feeling.)

Show film "You and Your Sense of Touch" to discover more about the sense of touch.

Learn from record "Put Your Finger in the Air."

III. SEEING

Vocabulary

beautiful

magnify

mix

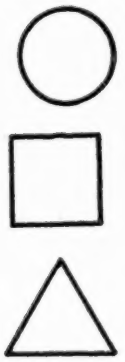
movement

shapes

sizes

Apparatus, Equipment

magnifying glasses



cut

from

felt

III. SEEING

Problems and Concepts	Resources
We see colors	Riverside City Schools, Science Guide, Vol. I
We see shapes.	Winston, The New I Wonder Why
We see sizes.	Singer Science Series, We Look and Listen
We see movement.	Schneider, Work and Play, Book I
We need light to see.	Filmstrip: #3713f, "Light, Heat, Sound"
Some animals can see at night.	
We take care of our eyes.	
We use our eyes to enjoy the beauty around us.	

III. SEEING

Activities

Look at pictures.

Use color games.

Use □'s, △'s, ○'s on flannel board.

Look at things under a magnifying glass.

Discuss how light and sharp objects can hurt our eyes.

Show filmstrip "Light, Heat and Sound" to discover effects of light.

IV. HEARING

Vocabulary

ear drums

sounds

vibrations

Apparatus, Equipment

autoharp

bells

clocks

horn

radio

telephone

IV. HEARING

Problems and Concepts	Resources
We hear different sounds with our ears.	Schneider, Science for Work and Play, Vol. I
We communicate with each other through sound.	Singer Science Series, We Look and Listen
We take care of our ears.	Filmstrip: #3713f, "Finding Out About Sounds"

IV. HEARING

Activities

Listen to sounds of different things.

Show filmstrip "Finding Out About Sounds" to discover how sound is made.

Culminate the unit by making a booklet classifying the pictures under the proper headings:

Smelling
Tasting
Feeling
Seeing
Hearing

HLC:nb

SCIENCE GUIDE

Unit Plants

Grade One

Fresno County Schools

HAROLD L. COLES, Superintendent

September, 1964

VOCABULARY

aquarium

avocado

catalog

climb

cover

cycle

dandelion

deciduous

diorama

evergreen

fertilizer

floaters

germinate

halfway

hitchhiker

lengthwise

moist

nursery

observe

parasite

parachutist

roots

shrub

stem

soil erosion

twigs

trunk

vines

weed

APPARATUS, EQUIPMENT AND SUPPLIES

ammonia
bird seed
blotting paper
bulbs
cake pan
cardboard
carrot tops
clothespins
crayons
drinking glasses
flannel
flower pots
food coloring
glass plates
horseradish tops
ink
medicine bottle
milk cartons
pebbles
pie tins
pogodas
potatoes (Irish & sweet)
rocks
sand
sawdust
seeds of all kinds
shoe box
soil
sponge
stems of plants
string
vaseline

PROBLEMS AND CONCEPTS	RESOURCES
There are many different kind of seeds.	Books: Beauchamp, Science Is Learning Parker, Seeds and Seeds Travel Blough, Plants 'Round the Year Wood, Plants with Seeds Beauchamp, Science Is Fun Films: "Learning About Seeds" "Hiking Is Fun"
Are all outside cover of seeds alike?	Books: Foster, Seeds Are Wonderful Navarra & Zafforoni, Today's Basic Science

ACTIVITIES

Initiate this unit by making a chart showing the different kinds of plants--trees, grass, flowers, weeds and vegetables.

Have a bulletin board with different headings and have the children bring pictures in to put under each of the headings.

Show the film "Hiking Is Fun" to note different types of plants.

Study the different sizes and shapes of the plants.
Some trees grow large, long trunks and give height.
Shrubs are like little trees that grow close to the ground.
There are vines that climb trees, fences, and houses.
There are grasses that just cover the ground.

Encourage the children to bring samples of different types of plants.

Discover different kind of seeds by making a collection of all kinds of seeds such as grain, weeds, fruit, nuts and flower seeds.

Classify them as to seeds we eat, unwanted seeds and flower seeds.

Take a walk around the school ground in the late fall or early winter to find many seeds.

Show the film "Learning About Seeds."

Call attention to the size, shape and color of many seeds. Radish seeds are small, watermelon seeds are black, pumpkin seeds are white, avocado seeds are oblong, coconuts are large and sweet pea seeds are round.

Make a bulletin board of the seeds we eat such as corn, peanuts, nuts, beans and pears.

Discover that all seeds have outside coverings. Bring samples of fruit, corn, peas, beans, etc.

Cherries and fruit outside covering is called skin.
Corn is called husk.
Peas and beans are called pod.
Orange, grapefruit and lemon are called rind.
Banana is called peeling.
Outside of a nut is called shell.
Outside of a grain of wheat is called a hull.

Make a study sheet or chart showing the different kinds of outside covering of the seeds.

PROBLEMS AND CONCEPTS

Seeds travel by wind, birds, people and animals.

RESOURCES

Books:

Beauchamp, Science Is Learning
Dickinson, The First Book of Plants
Wood, Plants with Seeds
Miner, The True Book of Plants We Know
Webber, Up Above and Down Below and Travelers All
Jordan, Seeds by Wind and Water
Foster, S[illegible]s Are Wonderful
Selsam, Seeds and More Seeds

Pamphlets:

Vessel and Wong, How to Stimulate Your Science Program
Whitman Publishing Co., Day Science
Parker, Seeds and Seeds Travels

Filmstrips:

"How Seeds Are Scattered"
"Plants and Seeds"

ACTIVITIES

Some seeds travel by water.
The lotus, a kind of water lily has seed pods with large air spaces that make them light enough to float.
Dandelion seeds will float on water.
Coconuts can float across a river or ocean.

Some seeds travel by animals and birds.
Squirrels carry acorns and pine nuts away, bury them for future food, and forget where they left them.
Some seeds stick to animals' fur and peoples' clothing. Wild barley, needle grass, filarees, cockle bur, bur clover, beggarweeds are a few. Drag a piece of flannel through the grass and discover what it picks up.
The bird may digest the soft part of the fruit but it may not digest the seeds. The seeds may go through the bird's body and still be able to grow when they are dropped to the ground.

Some seeds travel by land.
Many of the wildflowers form seeds and they just drop to the ground and grow.

Some seeds travel by the parent plant throwing them some distance.
Plants such as ivy, strawberry plants, and other berry plants just put out runners and these new runners become plants.
Seeds such as apples, peaches and plums will sometimes hit the ground with a bounce and roll a short or long distance away from the parent tree.

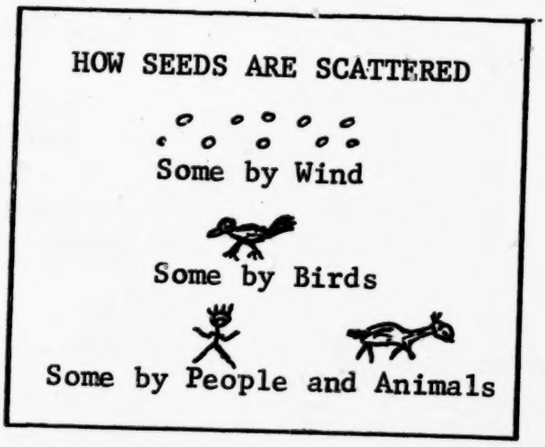
Some seeds travel by air.
Some seeds have wings and can travel through the air like a glider (Maple).
Pine and fir trees' seeds have wings. Some such as the dandelion are soft and feathery which float like parachutes through the air.

Set up a diorama showing how seeds are dispersed. Show seeds that are hitchhikers, parachutists, water floaters and those that pay for their rides by serving as food.

Write a creative story about a seed that travels far.

Show the filmstrip "How Seeds Are Scattered."

Make a bulletin board like the following:



PROBLEMS AND CONCEPTS	RESOURCES
All plants do not grow from seeds.	Books: Podendorf, Plant Experiments Darby, What Is a Plant? Dickinson, The First Book of Plants Miner, The True Book of Plants We Know Webber, Bits That Grow Big
All seeds come from flowers.	Film: "Wonders of Plant Growth" Beauchamp, Science Is Learning
What is in a seed?	Books: Dickinson, The First Book of Plants Beauchamp, Science Is Learning Blough, Plants 'Round the Year Wood, Plants with Seeds Podendorf, The True Book of Plant Experiments Zim, What's Inside of Plants Song Book: Wood and Scott, "Singing Fun" Selsam, Seeds and More Seeds

ACTIVITIES

Discover that some plants grow from slips. Just put the stem of an ivy, pussy willow, or geranium in the water in a glass jar. Watch for the roots to develop. Then plant in the soil.

Discover that some plants grow from leaves. Take a leaf from an African Violet and put in the water. Watch the leaf develop the roots. Then plant in "Black Magic."

Plant a sweet potato with only a part of it in the water. Watch it grow into a new vine.

Discover that ferns, mosses, lichens, mushrooms and toadstools grow from spores not seeds.

Observe a strawberry plant growing from a ground stem.

Plant a piece of potato (Irish) with an eye on it.

Graft new plants on an old limb.

Show the film, "Wonders of Plant Growth."

Discuss the different way some plants form seeds from flowers. (Apples, potatoes, peas, beans, corn, tomatoes, wheat and oats.)

Observe a sweet pea when it is in bloom and watch the seed form. The green lumps in the pod are seeds.

Make a study sheet or chart showing different kind of flowers and the seeds each flower produces.

Discover what is in a seed.

Put some bean seeds in water overnight, then lay them on a wet blotter for a day or two.

Put seeds in water overnight. Put some wet paper in a pan. Put the wet seeds on the paper. Wet the paper every day and in four days open one of the seeds.

Find the baby plant in the seed. (avocado seed) The part around the baby plant is the food provided by the mother plant.

Line a jar with paper toweling or blotting paper and keep about an inch of water at the bottom of the glass. Slip lima bean, grass or radish seeds between the paper and the glass. Seeds will sprout in a few days. Bring out that the seedling is using its own food to make its roots, stem and leaves grow.

Learn the song, "Little Seeds."

Read the story, <u>Seeds and More Seeds</u>.

PROBLEMS AND CONCEPTS	RESOURCES
Roots grow down and the stems grow up.	Podendorf, The True Book of Plant Experiments Wood, Plants with Seeds Webber, Bits That Grow Big Dickinson, The First Book of Plants Foster, Seeds Are Wonderful Webber, Up Above and Down Below and Travelers All Pamphlets: Blough, Plants 'Round the Year Vessell, How to Stimulate Your Science Program Films: "From Seeds to Plants" "Let's Watch Plants Grow" Filmstrips: "Finding Out How Plants Grow" "How Seeds Sprout and Grow Into Plants" "The Parts of a Plant"
Do some plants live well in water?	Film: "Plants in the Aquarium"
What is the purpose of the roots?	Selsam, Play with Plants

ACTIVITIES

Show film, "From Seeds to Plants" to discover that roots grow down and stems grow up.

Bring grass roots in the classroom to see where the roots are.

Place seeds between pieces of cotton and glass plates. Hold the plates together with clothespins. Place in a cake pan and hold upright with string or tape. Put sand in pan and keep moist. Watch the roots to see where they grow.

Place a variety of seeds between a glass and piece of blotting paper. Sand, soil or sawdust may be used in the glass -- do not overwater. Observe.

Plant bulbs in rocks to show the roots.

Compare different kind of roots by pictures, a chart or make a study sheet showing the different kinds of roots and stems.

Observe plants growing in ponds, swamps and near rivers.

Discover kinds of plants that grow in the aquarium by seeing the film, "Plants in the Aquarium."

Place a carrot, which is a root, in a glass of water that has food coloring or ink in it. (Leave the top green stems and leaves on the carrot.) The color can be seen in the leaves and stems as it is carried from the roots up through the stems to the leaves.

Take two plants and put fertilizer in one and not the other. Water both the same and see that both are in the sunshine. Note that the roots take in more than just water.

PROBLEMS AND CONCEPTS	RESOURCES
Is soil important to growing plants?	Dowling, The New I Wonder Why Beauchamp, Science is Learning Pamphlet: Vessell and Wong, How to Stimulate Your Science Program Filmstrip: "How Plants Live and Grow"
Do seeds need soil to start their growth?	Podendorf, The True Book of Plant Experiments Pamphlets: Vessell and Wong, How to Stimulate Your Science Program
So seeds need warmth to start their growth?	Beauchamp, Plants 'Round the Year Foster and Querre, Seeds Are Wonderful Webber, Bits That Grow Big Pamphlet: Blough, Plants 'Round the Year Filmstrip: "Plant's Needs"

ACTIVITIES

Discover the importance of soil.
Put one seed in a pan of soil and one seed in a jar of rocks.
Put water in the jar of stones until it covers part of the seed.
Water the seed in the pan of soil, too. Watch it for three weeks.

Cut one side out of some milk cartons to make flat boxes. Grow plants in sawdust, sand (clean sand) and various kinds of soil to determine if there is any difference in plant growth.

See the film, "How Plants Live and Grow."

On a piece of flannel arrange assorted seeds. Roll up carefully and fasten roll with rubber band. Moisten flannel roll and place into a jar; cover lightly. Examine every 3-5 days. When seeds germinate they may be transplanted into pots.

Place a variety of seeds between a glass and piece of blotting paper, sand soil, or sawdust may be used in the glass -- do not overwater.

Use two pieces of flannel or blotting paper and two pie tins. Place seeds on moistened flannel and then cover with other pie tin.

Make a surprise garden.

Place a sponge into a dish of water. Sprinkle some bird seed over the sponge and watch the variety of sprouts.

Pack as many dry peas or beans as possible into a flat medicine bottle. Screw the cap on loosely and turn it upside down into a drinking glass half full of water. Let it stand for several days and watch what happens to the bottle.

Take two plants the same size. Put one in a warm, sunny room and the other out in the cold. Put both plants in the sunlight and water both. See what happens to the plants.

Notice that in the winter outdoor plants do not grow.

Plant two seeds in different pots. Water both pots but put one in the refrigerator. Observe.

Show filmstrip, "Plant's Needs."

PROBLEMS AND CONCEPTS	RESOURCES
Do plants need light?	Winston Company, The New Learning Why Hyde & Keene, Hobby Fun Book
	Film: "What Plants Need for Growth"
	Hyde & Keene, Hobby Fun Book

ACTIVITIES

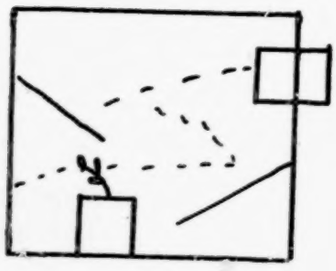
Get three pots and put plants in them. Set the pots with the growing plants in sunlight. Keep the soil most. Give plants food to keep them growing. Do the plants grow more on the side toward the sun? Watch the plants for a week or two. Then turn one of them halfway around. Turn another one only a little way around. Do not turn the third one. Make a record of what happens.

Plant two seeds in different pots. After both plants are up cover one with a tin can and the other one cover with a glass jar. Water both the same.

Show the film "What Plants Need for Growth."

Discover that a plant grows toward the light.

Use a shoe box with its lid, a bean plant about two or three inches high, masking tape, knife, piece of cardboard. Using the tape, attach two squares of cardboard as shown. Cut a window near the top. Put the plant inside and replace the lid on the box. Open daily only long enough to water the plant. Keep the window at the top facing the sun. It may be several weeks before the plant reaches the window.



Learn the song "Spring." (to be duplicated only with permission)

Make a surprise garden.

Materials: A horseradish, carrot tops, pebbles or pearl chips, tray or dish, little figures, bridges, pagodas. These may be bought in a dime store - or model them with an oil type clay which does not get hard - or from softened candle wax.

What to do: Put pebbles or pearl chips along one end of the dish to make the shore. Plant some carrot tops in these. Cut the clumpy end from the horseradish and place in the dish. Split the long part of the horseradish and arrange the two parts in the dish. Place the little bridges and pagodas as you wish, then fill the dish with water.

Your garden will grow for a long time if you keep the water fresh.

PROBLEMS AND CONCEPTS	RESOURCES
Weather affects plants	Pamphlets: Blough & Parker, Plants 'Round the Year Cormack, The First Book of Trees Parker, Winter Is Here Parker, Spring Is Here Parker, Fall Is Here Parker, Summer Is Here Films: "Spring On the Farm" "Summer On the Farm" "What the Frost Does" Filmstrips: "When Autumn Comes" "Plants Grow" Tresselt, Johnny Maple Leaf
Does a plant need water?	Beauchamp, Science Is Learning Podendorf, The True Book of Plant Experiments Foster & Querre, Seeds Are Wonderful Webber, Bits That Grow Big Filmstrip: "Plant's Needs"
How plants drink water.	Hyde & Keene, Hobby Fun Book Selsam, Play with Plants

ACTIVITIES

Spring -- Show pictures of what plants look like in spring. Show the film, "Spring On the Farm."

Winter -- Show pictures of what the plants look like in winter.

Fall -- Watch the leaves of the trees begin to turn different color. Read the story, Johnny Maple Leaf.

Summer -- Show the film, "Summer On the Farm."

Have the children fold a large piece of paper into four squares and have them draw pictures of plants to represent each of the four seasons.

Put good soil in two pots and plant the same kind of seeds in each and do not water one. Observe.

Take three glasses and put paper in all three. Put the seeds between the paper and glass. Water two glasses only. Observe what happens. After the plants have started growing stop watering one plant. Observe what happens.

Use a carrot with the top on, or a stalk of celery with the leaves on, or a white flower such as a carnation. Water colored ink (green for carrot and red for celery), household ammonia.

Cut the bottom from the celery or carrot and stand it in plain water for a few hours, then color half a glass of water with 2 teaspoonfuls of ink and put the carrot or celery in it. Let it stand for 2 hours at least. Put the celery in bright sunlight. Cut the carrot open lengthwise to see the carrot surprise.

Use any colored ink for the flower. Use 2 teaspoonfuls to a half glass of water and stand the flower in this until it is colored. Put 1 tablespoon of household ammonia in 1/4 glass of water and stand colored flowers in it. Watch for a color change.

PROBLEMS AND CONCEPTS	RESOURCES
Life cycle of a plant.	Beauchamp, Science Is Learning Film: "From Seeds to Plants"
What part of the plant do we eat?	Filmstrip: "Plants We Use"

ACTIVITIES

Discover how leaves drink water.

Materials: A leaf from a plant, cardboard, vaseline, 2 water glasses the same size.

Fill one glass with water. Grease the rim of the glass, then lay a piece of cardboard on top. Make a small slit in the cardboard just big enough for the stem of the plant to go through. Push the stem through the slit and put the vaseline around it. Grease the rim of other glass and put it upside down on the cardboard over the leaf. No water can get through the cardboard or the slit because they are sealed with the vaseline. Yet in five or six hours you will see water droplets on the upper glass. The water has gone through the stem of the leaf and is given off through the little holes, called stomata, in the underside of the leaf.

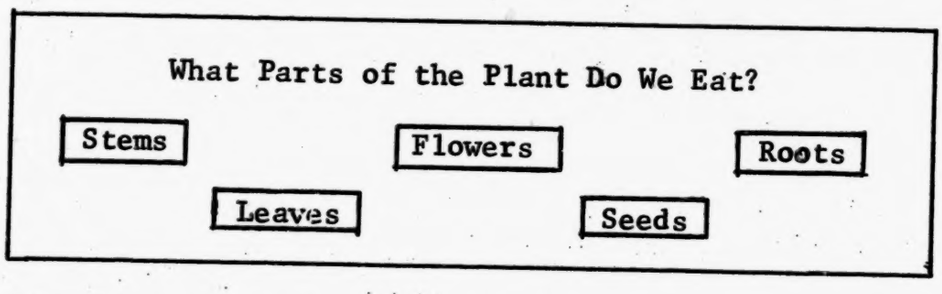
Discover the cycle of the life of a plant that lives once a year. Seed to flower and back to seed. (Sweet Pea)

Discover that other plants live a long time. Some live through the winter. Make a chart showing plants that live a short and a long time.

Discuss that the plants come from pre-existing parents and grow to be like the plants from which they come. See film, "From Seeds to Plants."

Make a bulletin board headed, "What Parts of the Plant Do We Eat." Add six subtitles as follows: Seeds, Roots, Leaves, Stems, Flowers, and Fruits. Have the children draw or cut out pictures from magazines and put under each subtitle.

Seeds: Cereals, rice, peas, beans, corn bread, coffee, cocoa, nuts.
Roots: Radishes, carrots, beets, parsnips, turnips, potatoes, tapioca.
Leaves: Lettuce, cabbage, spinach, parsley, tea, brussel sprouts.
Stems: Celery, asparagus, broccoli, sugar cane.
Flowers: Artichokes, cauliflower, broccoli.
Fruits: Tomatoes, berries, melons, grapes (raisins), citrus, apples, peaches, pears, apricots, figs, dates, plums, prunes.



Make a study sheet or chart on the parts of plants we eat. List parts of the plant and draw a line from picture to the word noting part of the plant.

Show the filmstrip, "Plants We Use."

PROBLEMS AND CONCEPTS	RESOURCES
What food does a child need to grow?	Beauchamp, Science Is Fun Beauchamp, Science Is Learning Pamphlet: Parker, Useful Plants and Animals Film: "Why Eat Our Vegetables?"
What food do the animals need to grow? What are buds?	Beauchamp, Science Is Fun Beauchamp, Science Is Learning Pamphlet: Blough, Plants 'Round the Year
Flowers are plants.	Song Book: Wood & Scott, Singing Fun Film: "Learning About Flowers"

ACTIVITIES

Show the film, "Why Eat Our Vegetables" to see why we should eat vegetables.

Make a bulletin board showing body building foods and not body building foods. Have the children bring in pictures for each.

Tell the flannel board story, "The Tooth That Cried."

Study different animals as to their eating habits. Show pictures of different animals eating different types of plants.

Bring twigs into the classroom in the spring and watch the buds come forth. Buds either produce flowers or leaves.

Inside every bud there is the baby leaf or flower.
Use a magnifying glass to look at the new buds.

Potatoes have buds. Watch potatoes sprout. (with or without water) These sprouts are called buds or sometimes they are called eyes. Potatoes will sprout in the fall.

Watch the buds open sooner in the warm room than outside.

Sing the song, "Pussy Willow."

Make pictures of "Pussy Willows" - use popped popcorn for buds woofing for stems.

Discover that flowers are plants.

Take a walk around the school to look for flowers in bloom.

Take a walk around the neighborhood to see flowers.

Take a trip to the nursery to see flowers and shrubs in bloom.

Plant different flower seeds.

Bring a flower catalog to school to show different flowers.

Compare flower seeds with vegetable seeds. Plant each side by side.

PROBLEMS AND CONCEPTS	RESOURCES
What are weeds?	Podendorf, The True Book of Weeds and Wildflowers
Weeds do harm.	Podendorf, The True Book of Weeds and Wildflowers
Are weeds useful?	
What are trees?	Dowling, The New I Wonder Why Darby, What Is a Plant? Podendorf, Plant Experiments Udry, A Tree Is Nice Darby, What Is a Tree? Pamphlets: Blough, Useful Plants and Animals Parker, Summer Is Here Parker, Winter Is Here Parker, Spring Is Here Parker, Fall Is Here Cormack, The First Book of Trees Parker, Trees

ACTIVITIES

Make a study sheet or a chart of different plants without the flowers attached. Draw lines from the flower to the plant.

Show the film, "Learning About Flowers."

Talk about the kind of plants we find growing wild by the side of the road. Try to find some wildflowers to show they are not harmful but are a thing of beauty.

A weed is something that is not planted. (Any plant that is growing where it is not wanted.) A sunflower growing in the field of corn is called a weed.

Weeds that grow along the side of the road are unwelcome but if we plant the same weed in our yard it is welcome.

Talk about the harm the weeds can do to our plants. They take food and water from the soil which the plants we planted want and need. They sometimes grow tall and shade the plants. Some hang on to other plants and pull them down.

Discover that weeds are a parasite and will in time kill the plant we want to grow.

In pulling the weeds pull them up carefully by the roots to prevent them from starting up again. Try to pull the weeds up before they make seeds.

Discuss different methods of getting rid of weeds.

Pull weeds up by the roots.
Hoe gardens carefully.
Plow fields well.
Prevent weeds from making seeds.
Apply weed killing chemicals or oils.

Sometimes weeds do good instead of harm. They may keep the soil from being washed away by water.

Discover that trees are just big plants. They have stems, roots, leaves and flowers just like plants do. Observe plants around the school and home.

Read the book, A Tree Is Nice.

Have the children bring in different types of leaves. Compare the different kind of leaves. Use study prints, "Broadleaf Trees."

Put leaves under a piece of paper and run the flat side of the crayon over the paper. (art lesson)

Plant tree seeds in the fall and watch them grow to likeness of the parent plant.

Show the film, "The Tree."

PROBLEMS AND CONCEPTS	RESOURCES
How do trees help us?	Films: "Leaf" "The Tree" Filmstrips: "Trees" "Trees Grow" Forler, Day By Day With Science Beauchamp, Science Is Learning Wood, Plants with Seeds
Do the trees look the same all year 'round?	Bancroft, Down Come the Leaves Podendorf, The True Book of Trees Pamphlet: Blough, Plants 'Round the Year

ACTIVITIES

Gives us food. Name the different kinds of fruit we get from trees.

Trees give us wood. Name the uses of wood. (fire, houses, furniture, etc.)

Gives us shade. Talk about why we want shade.

Study importance of soil erosion with trees.

Make a study sheet or chart of the different kinds of fruit and the things the trees give us. Put a few things on the chart or study sheet that a tree does not give us for added interest.

Collect different things that a tree gives us.

Observe some trees at different times of the year. Select a deciduous tree (one that loses all its leaves during the fall) and observe its changes throughout the school year.

If possible observe an evergreen tree and bring out that evergreen trees shed their leaves (needles) continuously, and that new leaves grow where old ones drop off.

Show the different seasons and the way the trees look in each season.

Read the book, Down Come the Leaves.

PROBLEMS AND CONCEPTS	RESOURCES
Trees and how to start a few.	

ACTIVITIES

Plant some trees from seed: Poplar, elm, and maple seeds.

Plant after the seeds fall from parent tree, or keep in a cold place until ready to plant.

Grapefruit, orange, and lemon seeds: Soak overnight before planting.

Fig seeds: Wash the seeds out of the pulpy part of the fresh fruit. Put seeds in a glass of water and plant the ones that sink to the bottom.

Date seeds, acorns and chestnuts: Soak in water two days before planting.

Almonds and filberts: Crack seeds out of the shell carefully. Plant the shelled seeds soaking them first.

Walnuts and pecans, ash and sycamore seeds: Plant them in the fall and keep them outside on the window sill. In early spring bring them inside and they will soon start to grow.

Apple, peach, plum, cherry and pear seeds. Put seeds in damp peat moss in a jar and leave in refrigerator for about two months and they will then grow readily. Mix seeds with dampened (but not wet) moss before putting them in the jar. Look at them every week and turn them over a bit. When you see them starting to sprout, take them out and plant them carefully.

PROBLEMS AND CONCEPTS	RESOURCES
Culminating activity.	Darby, <u>What Is a Plant</u>? Filmstrip: "Finding Out About Seeds, Bulbs, and Slips"

ACTIVITIES

As a review of the study, show the filmstrip "Finding Out About Seeds, Bulbs, and Slips."

Make a chart or study sheet on how plants are alike.

Make a chart or study sheet on how plants are different.

Read the story, What Is a Plant?

Make a booklet illustrating how plants are different from people and animals.

A plant cannot see.
A plant cannot hear.
A plant cannot feel.
A plant cannot walk as children do.
A plant grows, blossoms, etc., just like a child.

Poem.

When I watch the onions row on row
Why, I can never see them grow!
The cabbages squat, beet tops green-red,
Stand still as soldiers made of lead.
But if I wait a week to look,
Beans reach like Jack's in the storybook!
Squash that showed just a tiny bit
Runs along like yarn that ladies knit!
And okra has not only grown,
Its spread leaf wings and almost flown!
I showed my Mommie; she nodded and smiled,
And said, "It's the same way with a child."

:nb

SCIENCE GUIDE

Unit **Animals**

Grade **One**

Fresno County Schools
HAROLD L. COLES, Superintendent
September, 1964

VOCABULARY

amphibians

aquarium

barn

burrow

cage

cave

colony

coop

crawl

cocoon

den

desert

fin

flipper

gallop

hibernate

hive

holes

hoof

insects

larvae

locomotion

mammals

migrate

nest

pen

reptiles

shells

terrarium

trot

APPARATUS, EQUIPMENT, AND SUPPLIES

animal cage and food for inhabitant

ant colony

aquarium

cat or cow noisemaker

chart materials

duck or moose call

empty grocery containers (student collection)

fertilized egg

glass jar

incubator (individual egg capacity)

magazines

magnifying glass

microscope

milkweed

old newspapers

outline map of world

shell collection

silk sample

silk worm and mulberry leaves

terrarium

PROBLEMS AND CONCEPTS

There are many different kinds and sizes of animals.

RESOURCES

Motion Pictures

"The Big Green Caterpillar"
"Night Out With Mr. Toad"
"Insect Zoo"
"Farm Animals"
"Ali and His Baby Camel"
"Mother Cat and Her Baby Skunks"
"Animals of Alaska"
"Birds In Your Backyard"

The Golden Book Encyclopedia of Natural Science (excellent pictures)

Filmstrips

"Animals To Know"
"Animal Babies"
"Just Animals"
"Learning About Amphibians"
"Learning About Mammals"
"Learning About Reptiles"
"Learning About Birds"
"Learning About Insects"

Study Prints

"Farm and Ranch Animals"
"Pets"
"Wild Animals"
"Common Insects"
Common Birds"
"Zoo Animals" (San Diego Project)
"Reptiles and Amphibians"

Books

Gans, Birds Eat and Eat

Cassell, Nature Games and Activities

Hittcourt, Field Book of Nature Activities

Child Craft, Vol. 9

Tensen, Come To The Zoo

Tensen, Come To The Farm

Tensen, Come To The Pet Shop

Tensen, One Day At The Zoo

ACTIVITIES

Initiate by visiting the zoo or farm.

Collect animal pictures showing a large variety. Display on bulletin board.

Compile a classroom scrapbook.

Invite a resource person to show an insect collection. (Many former college students have one.)

View small animals with a microscope.

Establish a bird feeding station outside the classroom window. Read Birds Eat and Eat

On an outline map of the world let children place animal pictures in proper locality.

Provide Vol. 9, Childcraft for independent pupil study.

Construct an insect zoo. Instructions on page 20-21, Vol. 9, Childcraft. (Identification of insects on page 22-23.)

Independent Reading:

Tensen, (pre-primer) Come To The Zoo
" (primer) Come To The Farm
" (reader) One Day At The Zoo
" Come To The Pet Shop

PROBLEMS AND CONCEPTS

Animals live in different kinds of places.

RESOURCES

Motion Pictures

"Snapping Turtle"
"Animal Homes"
"Animals in Autumn"
"Animals in Winter"
"Animals in Spring"
"Animals in Summer"
"Spotty, Fawn in Winter"
"Wonders In the Desert"
"Wonders In a Country Stream"
"Wonders In Your Own Backyard"
"Life In an Aquarium"
"Beach and Sea Animals"
"Monarch Butterfly Story"
"Animal Habitats"
"Mother Hen's Family"
"We Explore Ocean Life"

Filmstrips

"Insect Homes"
"Common Animals of Woods"
"Desert Reptiles"

Study Print

"Homes and Habits of Wild Animals":

Pamphlets

"Bird Nests" 15¢. National Audubon Society, 1130 Fifth Avenue, New York, New York.

"Turtox Service Leaflet No. 35' (1½¢)

Texts

Methods and Activities in Elementary School Science

Books

Shapp, Let's Find Out About Animal Homes

Childcraft, Vol. 9

ACTIVITIES

Initiate by discussion of various animals environments. What animals do we see at a pond or lake? In our backyard? In the air? What animals do we see in more than one place?

Collect and display pictures of animal homes.

Invite a resource person such as a ranger or a farmer to tell about homes of animals.

Exhibit a shell collection.

Raise a monarch butterfly.
Locate fresh milkweed for food supply in a jar of water. (Newspaper table covering aids clean-up.) See p. 16-17, Vol. 9, Childcraft.

Duplicate pictures of animal homes and ask pupils to supply correct animal or vice versa.
Examples: fishbowl
doghouse
hollow tree
cave

Read aloud Let's Find Out About Animal Homes.

Recall homes of animals from previously shown films to develop concept of many different kinds and sizes of animals.
Examples: "The Big Green Caterpillar"had four homes -- the egg, the tree branches, the cocoon, the garden.

Observe animal homes nearby.
Examples: beehive, anthills, spider webs, nest, mud dauber's nest.

Hatch an egg. Commercial incubators give step-by-step instructions and can be used successfully in the classroom. A pet hen could provide a valuable experience. See Childcraft, Vol. 9, p. 12 for chick hatching process.

Make an observation house for an ant colony. Order instructions from General Biological Supply House, 761-763 East 69th Place, Chicago 37, Illinois (1½¢ per copy). Ask for Turtox Service Leaflet No. 35.

A building contractor can supply information concerning protection against termites, and perhaps a sample of wood inhabited by termites. Termites can be kept in a glass jar for observation.

Set up a classroom aquarium, (See Childcraft, Vol. 9, p. 50-51.)

Set up a classroom terrarium, (See Childcraft, Vol. 9, p. 52-53.)

PROBLEMS AND CONCEPTS	RESOURCES
Animals move in different ways.	<u>Motion Pictures</u> "Animals Move In Many Ways" "Animals That Fly" "Learning From Pets in the Classroom"
Some animals are useful to us.	<u>Motion Pictures</u> "How Animals Help Us" "How Insects Help Us" "Billy's Useful Insects" "Life In a Garden" "Elephants" "The Beaver" "Poultry On the Farm" "Wool" "Shep, the Farm Dog" <u>Slides</u> Circus <u>Books</u> Beskow, <u>Pelle's New Suit</u>

ACTIVITIES

Initiate by discussing animal locomotion. Include some animals that have more than one type of locomotion --- a duck can walk, fly, or swim.

Keep and observe a pet in the room. Learning From Pets in the Classroom (MP) should be shown to motivate activity. Suggestions are given as to suitable pets.

Games of comparison can be played.
Which moves faster?
Which goes higher? - naming two animals at a time.

"What Animal Am I" played as pantomine.

Make word-picture charts headed:
Animals That Swim
Animals That Crawl
Animals That Walk

Enjoy animal rhythms.

Initiate by setting up a classroom grocery store (Effort may be used to better advantage if correlated with arithmetic unit.) Discuss displayed products and their animal source. Include canned meat, dairy products, eggs, honey, etc.

Collect scraps of wool and silk. Display with raw sheep wool and any phase of silkworm life. Silkworms are not difficult to raise in the classroom. Read Pelle's New Suit.

Resource person can relate the usefulness of animals and perhaps suggest how other animals can be trained to aid (as dogs to care for sheep or cattle).

Homework: Look at contents of cupboards. Find all products related to animals and tell the class how the animal was useful.

Make a poster or booklet of things we use that come from animals: milk, cheese, honey, butter, poultry, eggs, meat, leather goods, silk products.

Make a poster or booklet of animals that work: horses, dogs (farm, seeing eye, sled), animals that catch insects.

Make a poster of animals that give pleasure to man: pets, circus animals, zoo animals, appreciation of wild life. (Teachers may receive Outdoor California by request. Write Conservation Education Department of Fish and Game, 722 Capitol Mall, Sacramento, California - 95814.)

Churn butter.

PROBLEMS AND CONCEPTS

Sounds made by animals help us to identify them. (This area is developed in the area of sound, however it needs to be included at this point in the animal unit.)

RESOURCES

Motion Pictures

"Birds of Our Storybook"

Books

Ylla, Look Who's Talking

Fresno County Guide, Good Speech

ACTIVITIES

Initiate by reading Look Who's Talking by Ylla.

Play "What Animal Am I" with sound imitations.

Introduce a duck or moose call. Use a cat or cow noisemaker from a variety store.

Tape animal sounds, real and imitations. Let children identify.

Capture a cricket and observe.

Learn "What Animals Say" - a poem by Oma T. Miles (The Sound Way to Good Speech, p. 41).

Teacher-pupil participation "The Woodpecker" by Elizabeth Roberts (The Sound Way to Good Speech, p. 80). Other suitable selections are available. Teacher may select to fit the needs and interest of the class.

SCIENCE GUIDE

Unit Sound

Grade One

Fresno County Schools
HAROLD L. COLES, Superintendent
September, 1964

VOCABULARY

bang

diaphragm

echo

high

loud

low

megaphone

noise

pitch

pop

shout

soft

sound

vibration

vocal cord

whimper

whisper

APPARATUS, EQUIPMENT, AND SUPPLIES

articles (collect those that will make different sounds).

beeswax or paraffin

bells (many different kinds)

block of wood

board

box to hold articles

chart (tagboard)

cigar box

eggbeater

hammer

horn

kettle

nail (to punch hole in bottom of cans)

paper (to make megaphone)

paper fasteners

piano, pitch pipe or musical instrument

rattle

rubber bands

saw and board

scissors

string (10 or 15 feet)

tin cans (2)

tube (heavy cardboard)

vacuum cleaner

water

PROBLEMS AND CONCEPTS	RESOURCES
There are many kinds of sounds and many things make sound.	Filmstrips: "Finding Out About Sound" "Light, Heat and Sound"
All sounds are caused by vibration. Sounds tell us many things. Sounds may be high or low.	Films: "Sounds for Beginners" "Science Around You" "Science is Exploring" "The True Book of Sounds We Hear" "Sounds All Around"

ACTIVITIES

Initiate unit with a bulletin board. Place objects that make sound in circular pattern with roving going to an ear in the center. (Picture, or cut out of construction paper.)

Listen to sounds and discuss sounds we hear such as: Animal calls; sounds people make like singing, sneezing, laughing, etc; high sounds, low sounds; sounds around the house, vacuum sweepers, washing machines, etc.

Clap hands, tap foot, whisper, shut door, pop bag, etc.

Discover about sound by showing filmstrips: "Finding Out About Sound," "Light, Heat and Sound."

Take a trip through the school building, listen for sounds, walking, running, talking, furnace room machinery, cafeteria, shop, etc.

Walk around the playground or about the block, listen to cars, trucks, airplanes, dogs, birds, sprinklers, etc.

Draw pictures of things heard on the listening walk.

Make a listening chart - add to the bulletin board.

Collect many articles. Have pupils identify sound each makes without seeing it; ring bell; tear paper; shake a rattle; hit a block of wood; etc.

Discover how sound is made. Show film "Sounds for Beginners."

Discuss what some sounds tell us; baby crying, laughing, water running, sound of washing machine, sound of typewriter or telephone, etc.

Discover high and low tones.

Demonstrate pitch on the piano, pitch pipe or musical instrument.

Have upper grade pupils come in and demonstrate on their instruments.

Stretch a rubber band around an empty cigar box. Pluck the rubber band. Watch the band vibrate. Shorten the vibrating part of the band by pinching it near one end of the band over the open box. Pluck the band again. Listen to the higher pitch. Longer band, lower pitch. Shorter band, higher pitch.

PROBLEMS AND CONCEPTS	RESOURCES
Sounds may be loud or soft.	Pine, Sounds All Around Craig, Science Around You
Sounds may be pleasant or unpleasant (like noise).	Fresno County Schools, Electricity, Magnetism and Sound
What can we do to help us hear soft sounds better?	
Sounds are a way of communicating.	The Sound Way to Good Speech "The Old Gray Pussy Cat, page 117 Schneider, Science for Work and Play
Can sound travel through string?	Thompson-Scott, Talking Times Branly-Vaughn, Timmy and the Tin Can Telephone

ACTIVITIES

Place fingers on larynx--feel vibrations in voiced and unvoiced sounds.

Fill coke bottles with varying amounts of water to produce a musical scale.

Discover that sounds are loud or soft.

Use rhythm band to illustrate volume.

Use piano - loud march - soft march.

Discover how we hear soft sounds better.

Discuss the shape of different animal's ears. Do any of the shapes suggest that they might enable the animal to hear better? Listen to a person talk softly. Now cup your hands behind your ears. Can you hear the talking better?

Make a megaphone of paper, hold together with fasteners. Listen to talking with and without megaphone. Hold tube to your ear and let someone whisper softly. Same whisper without tube.

Discover that rugs on floor softens sound. Rubber heels on shoes softens sound.

Learn poem "Old Gray Pussy Cat" Sound Way to Good Speech, page 117.

Discover that music may be pleasant, crying may be unpleasant.

Make a chart classifying sounds (pictures): Sounds I like to hear - Sounds I do not like to hear.

Discover speech must be clear to be heard and understood.

By listening we hear and find out. Discuss telephone and radio.

Teach poem "Telephone" from Talking Time.

Read "Timmy and the Tin Can Telephone" to the children.

Make a tin can telephone.

Use cans with tops cut off smoothly so there are no rough edges. Punch a hole in the bottom of each can. Put the string through the holes, tying a knot at each end inside cans. Have one child walk away from another until string is held taut between them. One child puts can to mouth and talks into it while the other child holds the other can over his ear. (Talking into cans causes the bottom to vibrate. These vibrations travel along the string to the bottom of the other can.

PROBLEMS AND CONCEPTS	RESOURCES
Discover sounds which tell us someone is working.	Podendorf, The True Book of Sounds We Hear Brown, The Noisy Book and The Seashore Noisy Book
Discover sounds which we call transportation sounds.	Record: "Men Who Work At Our House" Thompson and Scott, "Talking Times"
Discuss and listen for animal sounds we recognize.	Record: LP 409 "Sounds of Animals" SA 108 "Sounds" Podendorf, The True Book of Sounds We Hear The Sound Way to Good Speech
Discover sounds of rain, wind, and hail.	Refer to weather unit "The Sound Way to Good Speech"
What do different bells tell us? School bell Church bell Sleigh bell Cow bell Ice cream bell Door bell	

ACTIVITIES - continued

Vibrations are set up in the bottom of the receiving can and are carried to the ear.) Now try waxing your string with paraffin or beeswax.

Discover working sounds. Behind a screen:

Hammer a nail into a board	Saw a board
Use an eggbeater	Type on a typewriter
Turn on a vacuum cleaner	Stir something with a spoon in a bowl

Discuss other things fathers and mothers do which we can recognize by the sound.

Listen to "Men Who Work At Our House."

Pupils find pictures and discuss sounds made by cars, bus, train, plane, wagon, truck, motorcycle, tricycle, doll buggy, skates, etc. Make a chart of transportation sounds.

Teach poems on transportation in "Talking Times."

Discuss animal sounds. Pupils report on what animals they heard at home, on a walk, at the neighbors. Dog, cat, cow, pig, horse, bird, frog. Film: "Sounds of Animals." Record: "Sounds." Poems about animals in "Talking Times" and "The Sound Way to Good Speech."

Discover sounds of weather. Listen to wind, rain, hail, and thunder. Discuss how we can tell it is raining - hear it - see it - taste it - smell it and feel it.

Discuss use of many bells.

Hold each bell up and pupils discuss its use - how it sounds, etc. Behind screen ring each bell and pupils tell which bell it is.

PROBLEMS AND CONCEPTS	RESOURCES
Different materials give different sounds when they are struck.	

ACTIVITIES

Note different sounds.

Pupils tap wood, metal, glass, stone, rubber, etc.

Tap various things in room, such as desk, chalkboard, metal leg of chair leg, and see if pupils with eyes closed can identify objects.

Discuss the importance of taking care of our ears.

SCIENCE GUIDE

Unit Geology

Grade One

Fresno County Schools

HAROLD L. COLES, Superintendent

September, 1964

VOCABULARY

differences

dissolve

erosion

escaping

evaporation

gravity

likeness

minerals

pressure

rotates

sphere

APPARATUS, EQUIPMENT AND SUPPLIES

cork

egg cartons

floating objects

flashlight

globe

hammer

jars (large and small)

magnets

penny

piece of glass

rock samples

salt

sand

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PROBLEMS AND CONCEPTS	RESOURCES
What is the shape of our earth? 1. The earth is large and round. 2. The earth is an uneven sphere of mountains, valleys, deserts, lakes, rivers, and oceans.	Film: "Big World"
How does the earth move? 1. The earth rotates but gravity holds things in their places.	Film: "Big Sun and Our Earth" Navarra & Zafforoni, Today's Basic Science
What is our earth made of?	Filmstrip: "What Is the Earth Made of?" Page, Rocks and Minerals Shuttlesworth, Rocks Childcraft, Science and Industry, p. 115
Earth is made of land, water, surrounded by air. Land Rocks and minerals.	
Why do we study rocks and minerals? 1. Rocks and minerals help us to learn about our earth. 2. Rocks and minerals help us in our everyday lives.	Page, Rocks and Minerals, p. 5 Syrocki, What Is a Rock? pp. 41-7 Childcraft, Science and Industry, pp. 124-5
What is a rock? A rock is a solid nonliving matter that is formed by nature.	Page, Rocks and Minerals Shuttlesworth, Rocks Shannon, Among the Rocks, p. 6 Film: "Rocks"

ACTIVITIES

Initiate by having an attractive bulletin board, various rock samples
the science table, and by showing the film, "Big World."

Show globe where there is land and water.

Compare the surface of the earth to a dried prune.

Jump up and realize that you must come down.

Drop an object and see that it comes down.

Use magnets for experimenting with gravity.

Use globe to demonstrate how the earth turns on its axis. While turni
the earth goes around the sun. Use flashlight to demonstrate the ligh
of the sun.

Show with globe and ball how the earth and moon go around the sun.

Have discussion of the many substances of which the earth is made.

Locate and show the land and water surfaces on globe.

List rocks and minerals that we use everyday.

Discuss common minerals, such as sand, water, and salt.

Note that a rock can be as big as a mountain or as tiny as a grain of
sand.

PROBLEMS AND CONCEPTS	RESOURCES
There are many different kinds of rocks. They differ in color. Some are hard and some are soft; some are smooth and some are rough; some are heavy and some are light; some are large and some are small.	Science Unit, Albany Unified School District, Albany, Calif. Shuttlesworth, Rocks, pp. 26-7 Syrocki, What Is a Rock? p. 7 Orr- De Vault, Geology, p. 23
Rocks often are different on the inside than they are on the outside. 1. To sort and classify rocks as to rough and smooth. 2. To observe likeness and differences in rocks. 3. To look for metals in different rocks.	Page, Rocks and Minerals, last page
Where are rocks found? Are rocks found everywhere? 1. Rocks and soil form the solid part of the earth. 2. Rocks are found under the water also.	Shuttlesworth, Rocks, p. 5
What causes rocks to change in size and shape? 1. Rocks are changed by running water and wind. 2. Rocks are broken by men and trees. 3. Rocks are broken by freezing water.	Orr- De Vault, Geology, p. 18

ACTIVITIES

Make simple collection to show each concept.

Determine hardness and softness by breaking with a hammer.
Scratch one rock with another to see which is harder.
Scratch a piece of glass with various rocks.
Handle rocks to experience heaviness or lightness.
Compare weights of rocks of similiar size.
Scratch soft specimens with a penny or a fingernail.

Break with a hammer and compare outside surfaces.

Children place the rocks in egg cartons to match the kinds of rocks that are glued to the lid of the egg carton.

Children place the rocks in piles of rough and smooth.

Put some rocks in a jar of water to show the colors of different metals. Use a magnifying glass.

Show globe.

Discuss.

Examine a waterworn pebble and its rounded, smooth surface.

Show how rocks are changed by mechanical means.

1. Fill a small jar with water.
2. Put a lid on the jar.
3. Place jar inside a large pan and set in a freezer.
4. The jar will break because when the water freezes it pushes against the jar.
5. Rocks break, as the jar did, because of pressure from ice and plants.

Take an excursion to observe root systems breaking through rocks or cement.

Discussion of wind and weather wearing down stones.

PROBLEMS AND CONCEPTS	RESOURCES
Does the earth wear out?	Filmstrip:
Wind and water help to wear away the land.	"The Earth Is Always Changing"
	Lyons and Carnahan, Knowing About Science, pp. 154-8
	Orr- De Vault, Geology, pp. 6-7
	Collins, The Wonders of Geology, pp. 60-5
	Neurath, The Wonder World of Land and Water, pp. 26-7
	Neurath, The Wonder World of Land and Water, pp. 20-25
	Fenton, The Land We Live On, p. 68-77
People change the land.	Syrocki, What Is a Rock? p. 26
	Fenton, The Land We Live On, pp. 64-7
Water	
Water is found in the oceans, lakes, rivers, streams, in the soil and in the air.	
Water goes into the air.	Friskey, The True Book of Air Around Us, p. 12
1. By heat.	
2. By wind.	
Uses of water	Science Teaching Guide, Kindergarten through Sixth, Dept. of Elementary Schools, San Francisco Unified School District
1. For plantsand animals.	
2. For dissolving many substances.	
3. For many things.	

ACTIVITIES

Discussion of wind and weather wearing away rocks and soil.

Watch dust blow. See, "The Earth Is Always Changing."

Show movement of sand in water by using a shallow pan containing a small amount of water and sand.

Place a pile of dirt under faucet and allow small amount of water to drop to show how the water wears away the land.

Look at pictures of the work of the wind in The Wonders of Geology.

Look at pictures of the work of the sea in The Wonder World of Land and Water.

Pictures of the work of wind and water in The Wonder World of Land and Water; The Land We Live On; What Is a Rock?

Show pictures in The Land We Live On and discuss them.

Observe some of the bodies of water around Fresno County.

Observe evaporation of water from articles in the schoolroom aquarium, and tempera paints.

Observe and collect pictures of some animals that live in the water.

Put some cut flowers and keep some without water.

Stir jello in water and watch it dissolve.

Experiment to find out if sugar, salt, sand, flour, and chalk dissolve in water.

Discuss how the fireman uses water in putting out fire.

Discuss ways we use water to keep clean, to wash dishes, etc.

PROBLEMS AND CONCEPTS	RESOURCES
<u>Air</u>	Filmstrip:
Air is a substance.	"Finding Out About Land, Air and Water"
Air is in places we think of as empty.	
Air occupies space.	Navarra & Zafforoni, <u>Today's Basic Science</u>
Air can keep water out.	
Air has weight - cold air is heavier.	
Fire needs air to burn.	
Why does water put out fire?	

ACTIVITIES

Discover that air is in places we think of as empty.

Partly fill a large vessel with water (use a glass aquarium if possible). Float a rubber toy. Now put toy under water and produce air bubbles. Let several children have an opportunity, then discuss.

Discover that air occupies space.

Use the same large vessel with water. Take tumbler and stuff a wad of paper into the bottom of the glass. Invert the tumbler and press into the water without tipping. In a few moments lift and pull paper out. It will be dry. Then repeat experiment using toy or cork. Let children try. Use other floating objects.

Discover that air can keep out water.

In the above experiment when the child tips the inverted tumbler, the toy and water rise so bubbles escape. Discuss bubbles as air and show that air escaping has been replaced by water.

Relationship between water and air. Water goes in if air goes out. Water goes out if air goes in. This shows air takes up space. Take a bottle and invert and submerge - then tip and fill with water - see air escape, then lift out and pour out water - bottle fills the air.

Discover that air has weight.

Cut and straighten out a wire clothes hanger to make a balance scale. Fasten paper bag to each end. See that scale balances. Heat air in one bag by placing candle or hot plate under it. Heated side rises. Why?

Discover that fire needs air to burn.

Light a candle. Put jar over candle to cut off air. Candle will slowly stop burning.

Experiment again. When candle is almost out, pull up the jar and give the candle some air. The candle will burn as well as ever.

Find why water puts out fire.

Water keeps out the air. The more air fire has, the faster it burns. Dirt will keep out the air, so a fire can be smothered.

HLC:nb